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Early Coronary Artery Disease in a Female Patient with Discoid Lupus Erythematosus and Hashimoto's Thyroiditis

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Abstract

BACKGROUND: Atherosclerosis is a chronic inflammatory condition involving the endothelium of the blood vessels, predominant the coronary arteries. Main risk factors are dyslipidemia, hypertension, diabetes, smoking, obesity, and lack of physical activity. Patients with autoimmune diseases, including rheumatoid arthritis, systemic lupus erythematosus, systemic sclerosis etc., have a twofold increased risk of developing CAD at younger age, compared with the general population.

CASE REPORT: A 41-year-old female patient, with history of smoking and dyslipidemia, was admitted to our hospital with acute inferoposterior myocardial infarction. Initially, coronary reperfusion therapy per protocol was administrated and primary percutaneous coronary intervention (PCI) was performed. Multivessel CAD was found, and two stents were implanted on obtuse marginal and circumflex artery. Transthoracic echocardiography (TTE) revealed left ventricle systolic and diastolic dysfunction with segmental hypokinesis. Additionally, the patient was first diagnosed with DLE at the age of 15, but the disease was uncontrolled in the last 7 years. She also has hypothyroidism, regularly treated with hormone replacement therapy. The patient was discharged with medicamentous therapy including dual antiplatelet agents, statin, beta-blocker, angiotensin-receptor blocker, potassium sparing diuretic and proton pump inhibitor. One month later, recoronarography was performed with stenting of left anterior descending artery. TTE showed improvement of the left ventricle systolic function with preserved ejection fraction. The blood test showed elevated levels of antithyroid antibodies. A rheumatologist was consulted, who recommended therapy with hydroxychloroquine and regular follow-ups.

CONCLUSION: In younger patients with chronic inflammatory diseases, inflammatory mediators play a significant role in the development of the atherosclerotic plaques, regardless of co-existing risk factors. Therefore, an early cardiovascular assessment is required in these patients for preventing severe or life-threatening cardiovascular events.

Introduction

Atherosclerosis is a chronic inflammatory condition involving the endothelium of the blood vessels, predominant the coronary arteries. Endothelial dysfunction is an early key step in the atherogenesis, leading to vasoconstriction, accumulation of low-density lipoprotein (LDL), monocytes, macrophages, fibroblasts, and smooth muscle cells that form the atherosclerotic plaque. The plaque rupture exposes the lipid core and leads to the adhesion and aggregation of platelets, activating the cascade of coagulation and forming platelet-rich thrombus. The main risk factors is dyslipidemia, high levels of LDL, low levels of high-density lipoprotein (HDL), hypertension, diabetes, smoking cigarettes, obesity, and lack of physical activity [1], [2]. Patients with autoimmune diseases, including rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), antiphospholipid syndrome (APS), and systemic sclerosis (SS), have a twofold increased risk of developing coronary artery disease (CAD) at younger age and tenfold risk of acute myocardial infarction, compared with the general population [3]. Lupus erythematosus is a multisystem, inflammatory, connective tissue disease predominantly affecting the skin, joints, and kidneys, as well as the blood vessels, heart, lungs, and brain. Discoid lupus erythematosus (DLE) is the most common subtype of chronic cutaneous lupus erythematosus that occurs more frequently in younger women. The generalized form of DLE is associated with a risk of progression to SLE up to 28% [4]. Patients with lupus erythematosus have a higher risk for cardiovascular morbidity and mortality, due to systemic inflammation and its directly and indirectly damaging effects on the blood vessels. In addition, the disease-associated risk factors in patients with chronic inflammatory conditions, such as treatment with corticosteroids or renal impairment, aggravate the traditional risk factors. Hashimoto's thyroiditis is autoimmune disease manifested by elevated antithyroid peroxidase and antithyroglobulin antibodies (a-TPO, a-Tg), eventually leading to decreased function of the thyroid gland. Hypothyroidism is associated with endothelial dysfunction, decreased arterial compliance, and impaired systolic and diastolic cardiac function, increasing the risk of heart failure, atherosclerosis, and CAD. In some patients, autoimmune disorders can present in conjugation with each other and even be underdiagnosed, due to overlapping clinical symptoms or radiology findings [5].

Case Report

A 41-year-old female patient with acute inferoposterior myocardial infarction was admitted to our intensive care unit in very critical condition, intubated, and defibrillated two times at 200 joules during transport in the ambulance vehicle. Electrocardiography on admission revealed sinus rhythm with ST-segment elevation in inferolateral leads and ST-segment depression in anteroseptal leads. Heart rate was 80 beats/min and blood pressure was 90/60 mmHg.

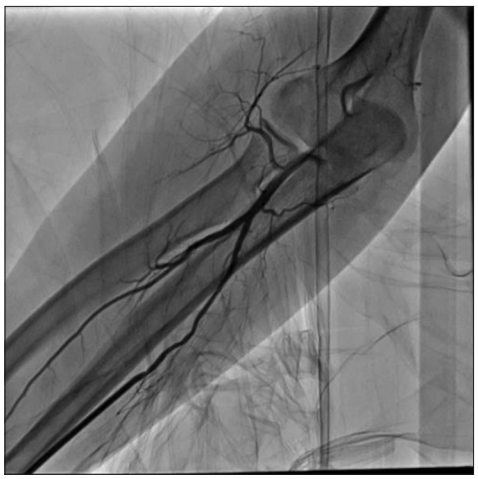


Figure 1: Transulnar approach

From medical history, the patient was first diagnosed with DLE at the age of 15, but the disease was uncontrolled in the past 7 years. She also had a history of smoking, dyslipidemia, and hypothyroidism, regularly treated with hormone replacement therapy. Initially, coronary reperfusion therapy per protocol was administrated. A day after admission, she was hemodynamically stabilized, extubated, and transferred to the catheterization laboratory. Primary percutaneous coronary intervention with transulnar approach was performed, due to chronic radial occlusion being present. Multivessel CAD was found and two stents were implanted on obtuse marginal (OM) and circumflex (Cx) arteries. Transthoracic echocardiography (TTE) revealed left ventricle systolic and diastolic dysfunction with segmental hypokinesis (Figure 1-4).



Figure 2: Angiogram of right coronary artery

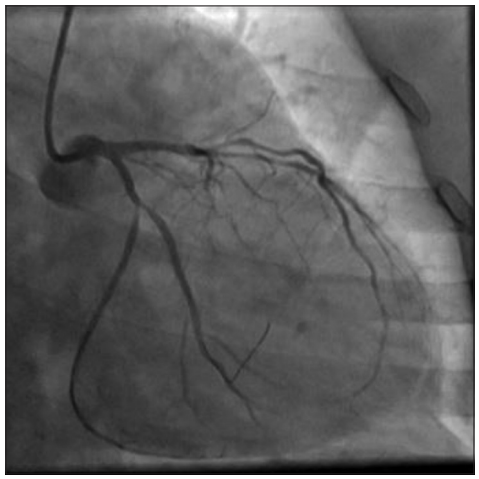


Figure 3: Angiogram of the obtuse marginal and circumflex artery

The patient was discharged with recommendation for medicamentous therapy including dual antiplatelet agents (acetylsalicylic acid 100 mg and prasugrel 10 mg, once a day), statin, beta-blocker, angiotensin-receptor blocker, and potassium-sparing diuretic and proton-pump inhibitor. One month later, a scheduled recoronarography was performed with stenting of the left anterior descending artery. This time, transfemoral approach was used because the previously used ulnar artery was occluded, even though patent hemostasis was used during the first intervention. Control TTE showed improvement of the left ventricle systolic function with preserved ejection fraction. Doppler ultrasonography of the carotid arteries and the lower extremity arteries excluded significant lesions or narrowings. Blood test showed elevated levels of antithyroid antibodies (a-TPO, a-Tg 160 U/ml), while the other immunological and rheumatological markers were negative. A rheumatologist was consulted, who recommended therapy with hydroxychloroquine (200 mg once a day) and regular follow-ups (Figure 5-8).

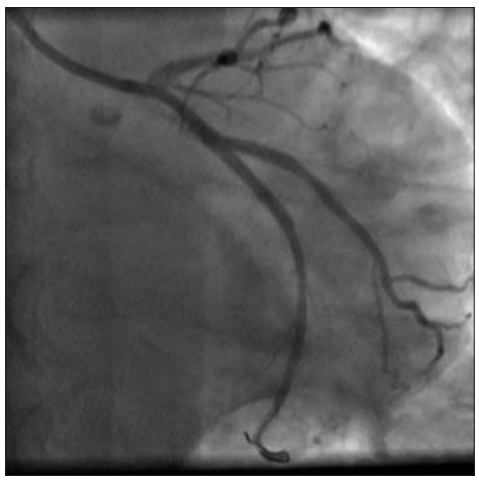


Figure 4: Percutaneous coronary intervention/stenting to the obtuse marginal and circumflex artery



Figure 5: Transfemoral approach

Discussion

In patients with chronic inflammatory diseases including SLE, APS, RA, and SS, early CAD has emerged as a major cause for morbidity and mortality. Recent epidemiological studies have linked systemic inflammation with the pathogenesis of atherosclerosis, leading to cardiovascular events such as CAD, peripheral artery disease, and cerebrovascular disease. The impaired immunological regulation with persistently raised levels of inflammatory mediators contributes to endothelial dysfunction, accelerating the atherosclerotic process. Inflammation and the C-reactive protein, an inflammatory marker with proatherogenic effect, are considered an independent risk factor for vascular disease. The treatment with corticosteroids as mainly used for autoimmune disorders is implicated as a risk factor for higher incidence of CAD, followed by the presence of renal disease or hypertension.

SLE is a chronic autoimmune disorder predominantly affecting women of childbearing age. The cardiovascular complications may be clinically silent in the initial stage or present as angina pectoris and acute myocardial infarction. APS is characterized by the presence of circulating antiphospholipid antibodies (lupus anticoagulant and anticardiolipin), thrombosis, and hypercoagulability and often occurs secondary to SLE. DLE is the most common form of chronic cutaneous lupus erythematosus, with more benign disease course compared with other subtypes. The multiple genetic similarities between SLE and DLE indicate a common pathogenesis, although their clinical manifestations are different [1], [2], [3], [4].



Figure 6: Angiogram of the obtuse marginal artery and circumflex artery

Our patient was diagnosed with DLE at the age of 15, long term treated with oral corticosteroids, but in the past 7 years, the treatment was discontinued. She also had Hashimoto's thyroiditis, regularly treated with hormone replacement therapy. A day before the admission to our clinic, she complained of a severe chest pain radiating to the back, followed by vomiting. She presented in a life-threatening condition with acute myocardial infarction (AMI) of the inferposterior wall. Coronary angiography revealed three-vessel disease and resolved with stenting of OM artery, Cx artery, and left anterior descending artery.

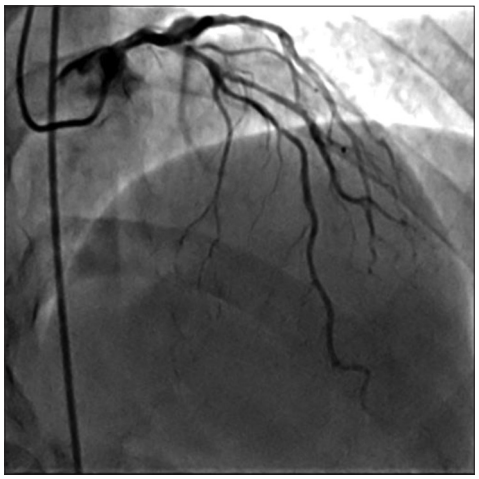


Figure 7: Angiogram of the left anterior descending artery

In a cross-sectional case–control study performed by Akarsu *et al.*, the prevalence of metabolic syndrome (MetS) and its components (dyslipidemia, hypertension, glucose intolerance, and central obesity) in patients diagnosed with DLE was evaluated. It was concluded that MetS with hypertriglyceridemia and low values of HDL among its components were more frequent in patients with DLE. Furthermore, the prevalence of cardiovascular diseases was increased by age, due to the above-mentioned risk factors [6]. In a Danish nationwide cohort study, higher risk of cardiovascular events and mortality in patients with SLE and DLE was determined, more significant in patients under 50 years of age [7]. Furthermore, it was concluded that the risk of cerebrovascular accidents and peripheral artery disease is two times higher among patients with cutaneous lupus erythematosus.

A study by Manzi *et al.* compared the cardiovascular event rates in women with diagnosed lupus erythematosus in the 35–45 age group, with the rates in women at the same age who participate in the



Figure 8: Percutaneous coronary intervention/stenting to left anterior descending

Framingham Offspring study, the study for incidence and prevalence of cardiovascular disease and the traditional risk factors. According to this comparative study, young premenopausal women with lupus erythematosus had 50 times more chances to have a myocardial infarction compared with the women of similar age who participated in the Framingham study [8]. A recent long-term follow-up study by Tselios *et al.* observed differences over time in the importance of risk factors for cardiovascular disease. In the 1st year of the disease onset, the traditional risk factors play an insignificant role, contrasted to the period when the disease activity is decreased [9]. A study by Esdaile *et al.* confirmed that the increased risk for cardiovascular and cerebrovascular disease in patients with lupus cannot be explained by the co-existing traditional risk factors alone [10]. Two retrospective cohort studies by Lin *et al.* evaluated the risk of AMI and mortality among patients with SLE, concluding that the risk of AMI is higher, particularly in female patients, classifying SLE as an independent risk factor for AMI and post-AMI mortality [11].

According to a cross-sectional observational study in a rheumatology unit by Posselt *et al.*, SLE and SS are systemic diseases with higher prevalence of antithyroid antibodies [12]. A study by Sara *et al.* evaluated patients with stable angina pectoris and with or without hypothyroidism, who underwent diagnostic coronary angiography. After invasive assessment of the changes in coronary diameter and blood flow was performed, it was concluded that women with hypothyroidism have a higher risk for CAD, due to endothelial dysfunction [13].

Conclusion

In younger patients with chronic inflammatory diseases, inflammatory mediators play a significant role in the development of the atherosclerotic plaques, regardless of co-existing risk factors. With the increased life expectancy of patients with autoimmune disorders, due to improved therapy solutions, cardiovascular diseases have emerged as a significant threat to the health of young patients. Therefore, an early cardiovascular assessment is required for preventing severe or life-threatening cardiovascular events. Better management of the risk factors is also needed, including change of life habits, smoking cessation, as well as prompt diagnosis and treatment of comorbidities.

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